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ABSTRACT

This paper summarizes research on learning styles, then examines the cognitive style of Native American primary school students. Five theories of cognitive style (Dunn and Dunn, Gregorc, Kagan, Witkin, and Cohen) are examined along with the test instruments these theories have fostered. A sixth concept of cognitive style, brain hemispheric preference, is applied to a study of 197 Native American children. Testing indicates these children show greater strength in right hemisphere processing. It is suggested this hemispheric preference is encouraged by both the maturation process during early childhood and by the Native American's learning style. Based on this theory, 10 criteria for beginning reading programs for Native American children are identified. A holistic approach which recognizes Native American language, culture, and learning styles to teaching language skills is recommended. (CS)

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Learning Styles and Native Americans

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Teachers are continuously looking for ways to make learning effective for students. Confronted with twenty-five to thirty unique individuals in a classroom, the task of finding the key to helping all of them become effective learners seems overwhelming.

In the early days of this country, the task was much less complex than it is today. All children weren't expected to go to school. If a child didn't demonstrate a "bent for book-learning" he was apprenticed to learn a trade. It wasn't considered necessary or even appropriate for everyone to learn to read and write. Someone in the family needed to be able to read the Bible and someone needed to be able to "figure" enough to keep accounts. But beyond that, education was left to scholars.

Times have changed considerably from those days. Now as a society we place much value on formal education. All children are obligated to go to school, and teachers are expected to teach them all to be functional users of written language in a highly literate society.

Teachers are faced with a wide range of individual differences. The human system for learning is complex and versatile. People are born with the potential for learning in a wide variety of ways. But they seem to develop only a part of that potential, designing their own unique styles of learning by selecting from that wide range of cognitive possibilities available to them.

Researchers have been engaged for a number of years in attempts to determine the ways people learn. How do people differ in the ways they put together their unique approaches to learning? Are there identifiable

learning styles? Do groups of people develop similar styles? Until recently, research into human learning has been limited by the unavailability of strategies for observing learning directly as it occurs. Learning occurs inside the human brain, hidden away from view. Researchers could only make conclusions about the learning process by carefully observing the outcomes of learning - what a person did as a result of learning. They had no way to actually observe the process as it was occurring, so they concentrated on observing the conditions that affected learning outcomes. Consequently, theories about how people learned were based on the researchers' study of conditions that affected learning, rather than on observation of the learning process itself. Because no one really knew what kinds of behaviors and conditions were the most important to observe, people observed different behaviors resulting in different explanations of learning style.

There are in the literature today many different researchers' descriptions of learning style. However, I have selected just a few that are the most well known or seem the most useful to teachers to summarize briefly.

Dunn and Dunn (1975) developed the Learning Style Inventory which purports to analyze the conditions under which a student is most likely to learn. The inventory is a self-report instrument based on a rank ordering of 104 items which assess thirty-six elements. These elements are classified as: (1) immediate environment (sound, light, temperature, and the physical design); (2) emotionality (motivation, persistence, responsibility, and need for structure or flexibility); (3) sociological factors (works best alone, in a pair, with peers or adults, or in various patterns); (4) physical needs (perceptual strengths, intake, time of day, and mobility). The Productive Environmental Preference Survey (PEPS), the adult version of the LSI, simultaneously identifies teaching style and reveals the areas that need to

be expanded to respond to additional student characteristics. The Dunns recommend that teachers use their instruments to assess their own and their students' learning styles and then do two things: (1) match instructional resources with identified student characteristics; and (2) gradually expand their present modes of operation to help students who have not responded to traditional strategies.

Anthony Gregorc (1979) described learning style as consisting of distinctive, observable behaviors that provide clues to the functioning of people's minds and how they relate to the world. His instrument, Transaction Ability Inventory, is a self-report instrument based on rank ordering of four words to each of 10 sets. This junior high to adult level instrument classifies learning styles as: (1) concrete-sequential; (2) concrete-random; (3) abstract-sequential; and/or (4) abstract-random. Concrete-sequential learners prefer direct, hands-on experience with touchable, concrete materials. They appreciate clearly ordered presentations in logical sequence. They look for and follow directions and they like a quiet atmosphere. Concrete-random learners have an experimental attitude and learn well by trial and error. They make intuitive leaps in exploring unstructured problem-solving experiences. These students work well by themselves or in small groups, but they do not respond well to teacher intervention in their independent efforts. Abstract-sequential learners have a wealth of conceptual "pictures" in their minds against which they match what they read, hear or see in graphic and pictorial form. They have excellent decoding abilities with written, verbal, and image symbols. These learners prefer a substantive, rational, and sequential presentation. They learn well from authorities and like vicarious experiences. Abstract-random learners prefer to receive information in an unstructured manner. They like activities which involve multisensory experiences and busy

environments. They prefer freedom from rules and guidelines and organize material through reflection to get what they want. These learners are attuned to nuances of atmosphere and mood. They associate the medium with the message and tie a speaker's manner, delivery and personality to the message being conveyed. They evaluate a learning experience as a whole.

The Dunn and Gregorc approaches to defining learning styles, although they are different in many ways, are both self-report instruments that assess a broad range of behaviors. The accuracy of the classification of learning style depends in part on how objective a person is able to be about personal feelings.

Other researchers based their hypotheses about learning styles on a narrower range of behaviors, depending on comparative research to demonstrate how the dimensions of cognitive style relate to broader aspects of behavior. They use the term "cognitive style" rather than the more general "learning style," describing differences as opposite ends of a continuum rather than discrete categories of behavior.

One of these cognitive continuums is described as impulsivity-reflectivity, typically measured by means of the Matching Familiar Figures (MFF) test (Kagan, 1965). The test contains practice problems and a series of experimental items, where the child is asked to look at a single figure and locate the one like it from a group of similar figures. The child is given a total of five trials to get the right response. The number of trials and the time of the first response are calculated to determine a classification of impulsive (responding quickly but not necessarily accurately) or reflective (responding accurately but more slowly). Apparently, where a child falls on the continuum designates a fairly stable cognitive style that generalizes to any problem solving situation where response uncertainty exists. Reflective

children evaluate alternative hypotheses more carefully than impulsives before they offer a response.

Herman A. Witkin (1971) originally designed the Embedded Figures Test to assess differences in perceptual style. The tasks require subjects to locate a previously seen simple figure within a larger complex figure which has been organized to obscure or embed the simple figure. The subject is shown a simple design and a complex design within which the simple design is embedded and asked to locate the simple design within the complex one. The complex figure is referred to as the field around the simple figure. A subject's speed and accuracy at accomplishing twelve such items determines whether the score falls at the field-independent or field-dependent end of the perceptual continuum. In a field-independent mode of perceiving (fast, accurate responses to the test items), parts of the field are experienced as discrete from organized ground. In a field-dependent mode of perceiving (less accurate and slower), perception is strongly dominated by the overall organization of the surrounding field, and parts of the field are experienced as "fused."

Later research with the EFT suggested that competence at disembedding in perceptual tests is strongly associated with competence in disembedding in non-perceptual problem-solving tasks. Witkin concluded that the EFT was assessing intellectual as well as perceptual activity and extended his description of the continuum of behavior being measured beyond field-dependent/field-independent to global-articulated. Apparently these different styles are applied to experiencing not only immediately present stimulus configuration (perception) but also to the experience of symbolic material (thinking). In learning situations, the field dependent person will view content in a global manner, tend to impose his or her own structure on the task, and have difficulty distinguishing parts of a task separately from the whole. The field

independent person, on the other hand, is able to "disembed" parts of a task from the existing organizational pattern and devise alternate organizational patterns, if necessary, to comprehend information.

Rosalie Cohen (1969), synthesizing the results of considerable research, identified two mutually incompatible conceptual styles - relational and analytic. The analytic cognitive style is formal, analytical, has a stimulus-centered orientation to reality, and is field independent. The relational style is self-centered in its orientation to reality, requires a descriptive mode of abstraction. This style focuses on the global characteristics of a stimulus and establishes meaning only in reference to some total context. These styles influence language selection and organization and attitudes about one's self and one's environment. Cohen concluded that incompatibility between the relational cognitive style of cultural minorities and the analytic style predominant in school systems constitutes a "culture conflict." The lower achievement of relational students is better attributed to this conflict than to "deprivation" or "cultural difference."

The five learning or cognitive styles I have discussed are examples of how different people have viewed these dimensions of learning differences. All of these theories are based on hypotheses made from observing learning behaviors in particular situations. Researchers interpret what they see and build hypotheses on the basis of those interpretations. Then they seek to establish the validity of their hypotheses by demonstrating that the results of instruments they design are reliable through repeated use. This was the only avenue open to theory builders. Recently however, the advance in neurological research and development of techniques for monitoring the functioning of the brain, have provided physiological data on which to build theory about human differences in cognitive style. We now can observe mental activity

as it occurs, rather than depending on inferences about the processes behind the behavior that is a result of cognitive processing.

Through the research efforts of Sperry (1973), Bogen (1975), Gassaniga (1975), and Ornstein (1978 we have learned that each of the hemispheres of the brain makes its own unique contribution to human learning. The left hemisphere specializes in linear, sequential information processing and abstract thinking. The right hemisphere specializes in relational, simultaneous information processing and holistic thinking. Learning anything beyond the most elementary task requires the cooperation of both hemispheres. However, some tasks apparently require more of the specialized functioning of one hemisphere or the other. For example, music and artistic tasks utilize more right hemisphere functioning. And language, especially the English language, depends more heavily on left hemisphere processes.

It would seem reasonable to expect that the brain would automatically activate whichever hemisphere was needed for the task at hand. However, that isn't the case at all. Instead, preconscious selection determines which hemisphere's strategies are put into operation. This hemispheric preference is the basis for a child's individual learning style. A child who activates predominantly right hemisphere processing strategies is said to have a right hemisphere dominant learning style. The child who activates left hemisphere processing, irregardless of whether it is the most appropriate for the task or not, is considered to have a left hemisphere dominant learning style.

It's really a problem, isn't it? We're being told that consideration of differences in learning style is important to meeting the needs of individual learners. But we are being bombarded with many different ways of describing the differences in learning style. Which one is the right one? Shall we go along with the Dunns? They sound reasonable. Or with Gregorc? He makes

sense, too. Or how about Witkin? Or Kagan? We can think about students we have known and think "That explains it! He must be field-dependent." Or "The reason Janie takes so long to answer questions is because she is a reflective learner." Deciding among these models is difficult because they all seem reasonable. The authors of all these models have invested a great deal of time and thought and research into their models. Shall we try to incorporate all of them into our teaching? That would be next to impossible. We need one dependable model to work from that is comprehensive enough to help us understand as wide a range of learning differences as is possible. And then we need to decide how we should apply that model to classroom learning situations.

I have selected the concept of hemisphericity as the model most useful to me for several reasons. First, I am more comfortable with a model based on actual monitoring of the processes of the brain than I am with those of people's interpretation of observable behavior. Secondly, I am convinced that the behaviors other theorists observed in identifying their cognitive continuums are actually influenced by hemispheric preference. For example, what Witkin observed and labeled field-dependent behavior can easily be explained as one aspect of right hemisphere dominance. In other words, I can readily fit all of the other theories into the concept of hemisphericity. They each appear to me to be pinpointing different aspects of the same phenomena: people tend to develop the processing of one hemisphere to a greater extent than the other. And they tend to show a preference for using their stronger processing strategies whether they are the most effective for the task at hand or not. My third reason for selecting the hemisphericity model is that it provides an excellent framework for understanding learner differences that result from cultural differences.

Researchers have suggested that this hemispheric preference is influenced by cultural background. Entire cultures, by emphasizing particular beliefs

and activities, encourage the development of one hemisphere to a greater extent than the other (Ornstein, 1972). The values and practices of the Euro-American majority culture suggest that left hemisphere processing is preferred. Native Americans, on the other hand, have studied the issue and concluded that their culture is based on right hemisphere dominance (Cattey, 1980, Ross, 1982).

At this time, determining the hemispheric preference of an individual requires brain scan techniques in a laboratory setting. Tests that can be used in a school setting with any degree of confidence have not yet been developed. However, it seemed to me that such cognitive processing differences might be reflected in patterns of scores on existing tests of cognitive development. To test my hypothesis, I explored the scores of 197 Native American children on the Wechsler Intelligence Scale for Children - Revised (WISC-R) (Browne, 1984). My study revealed a characteristic pattern quite different from that of the standardization population. Analysis of subtest specificity, means profiles, subtest scatter and factor structure suggested that the pattern reflects greater strength in right hemisphere processing. My results support the conclusions of students of the culture, such as Ross and Cattey, that the Native American culture encourages the development of a right hemisphere dominant learning style.

Native American children may come to school with a right hemisphere dominant learning style because they have spent their early years in a culture which emphasizes the use of right hemisphere cognitive processes. However, there are other not necessarily culture-based influences on learning styles of young children. Both maturation and parenting style may in some cases make an impact on learning style. Maturation may influence which hemisphere a child brings into play. When children are born, they are operationally

"right-brained" because the corpus callosum, the fiber connecting link which allows communication between the hemispheres of the brain, does not begin to be functional until a child is about two years old. As the corpus callosum matures, allowing integration of the processing of both hemispheres, the left hemisphere begins to play a larger role. This ongoing maturation process continues until puberty. Many children at school entering age may not have developed callosum maturity to a point where consistent access to the left hemisphere is possible. For all practical purposes they are "right-brained" at this point though they may develop very efficient use of left hemisphere processing in time.

Other children may be functionally "right-brained" because they have not been exposed by parents to life experiences which encourage the use of left hemisphere processes. As we have learned from Piaget's work, cognitive functioning develops as children interact with their environments, and it is the parents who generally control the activities which engage a young child's time and attention. If the interaction between parent and child makes much use of language (left hemisphere) and if the parent emphasizes such activities as counting, listening to stories, memorizing nursery rhymes, etc., the child is provided with optimum opportunity to develop skill with left hemisphere strategies. It seems very probable that some children may come to school with relative strength in the right hemisphere simply because they have not had the opportunity to develop the left.

Any one or a combination of these influences (culture, callosum maturation, parenting) may be operating to cause many Native American children to enter school with right hemisphere dominant learning styles. To attempt to determine the source of children's hemispheric preference is not as important as determining how to create an educational environment where they can use those hemispheric strengths to develop the skills that schools are designed to teach.

In most schools in this country, the linear, sequential processes of the left hemisphere dominate the curriculum and instructional methodology. It is not surprising, then, that right hemisphere dominant children are experiencing such a struggle to succeed. In the case of children from a right hemisphere culture, hemispheric preference has a broad impact on all kinds of learning situations. It creates a characteristic "right-brain" way of relating to all of life, affecting a wide range of behaviors. At this point I want to expand on how hemispheric preference influences behavior in two areas that are very relevant to school situations: language style and interpersonal interaction style.

Teachers need only to think of students who have been at the top of their reading class to understand the language style of left hemisphere dominant learners. They deal effectively with the abstractness of language, developing wide vocabularies of formal meanings. Meanings for the right hemisphere dominant learner, however, are much more self-centered. They are more concrete, tied to visual and tactile symbols. Meanings for words are not abstract from personal context. They have meanings specific to certain contexts. While left hemisphere dominant learners can use words with precision to communicate meaning, right hemisphere dominant learners have difficulty because meaning is embedded in their holistic experience. Conveying specific meaning through language requires a separation from immediate personal experience in order to attach verbal symbols to that experience. The right hemisphere specializes in direct, immediate, holistic functioning. It does not deal with time or with abstractions such as language. The right hemisphere dominant learner, then, will have difficulty using language to express explicit meaning. The left hemisphere dominant learner attaches language to meaning in order to store them in memory. The right hemisphere learner probably stores meanings

in pictures, impressions, etc., without attaching verbal labels to them. Consequently, when you ask right hemisphere dominant learners a question, in order to answer that question, they have to match your words with impressions they have stored, reorganize those impressions to formulate an answer, and then attach verbal symbols to the new organization to give you their answer. That takes time. You will need to allow ample "wait time" when you ask these children a question. If you don't, they may refuse to answer, or they may give you some off-the-wall answer that doesn't bear any relationship to the question you asked. Hemisphere dominant learners "talk around" the answer but don't quite express it clearly. You may have the feeling that these children know a lot more than they are expressing. When you read what they have written, you may get the feeling that the ideas are all there, but they aren't very well organized. It is very difficult to determine the depth of their understanding, because it is impossible to discern how well they understand the relationships between ideas. These are just a few of the differences in the way children use language that can be attributed to hemispheric preference. As we continue to learn more about how hemispheric preference affects performance in school, we will probably identify more.

Hemispheric preference also has an effect on interpersonal interaction style. Right hemisphere dominant learners prefer to establish a more personal and informal relationship with authority figures. They tend to respond holistically to teachers as individuals on a feeling level. They like to work with others toward a common goal, and they tend to avoid situations where they are expected to compete. They may be more likely to model teacher behaviors, and to seek direction and guidance from teachers. They may be highly motivated when working individually with the teacher. These children may seek social rewards rather than nonsocial ones. The left hemisphere

dominant learner, on the other hand, tends to relate to the teacher more objectively as a source of information. They often prefer to work independently and to compete to gain individual recognition. They tend to be more task oriented and less influenced by the social environment. Their interactions with the teacher are likely to be more formal and less personal in nature. They appear to be more independent of the teacher, wanting to try new tasks without teacher's help.

At this point, you are probably beginning to see a connection between behaviors I have been describing as characteristic of left and right hemisphere dominant learners and some of the children you are working with. I'd be willing to bet that your left hemisphere learners are your better achievers. And the behaviors that I have called right hemisphere dominant are ones you have associated with poor achievers. There is no connection between level of intelligence and learning style. However, there is a definite connection between learning style and level of achievement in school. The obvious reason for that, as I stated earlier, is that our school curriculums have been influenced predominantly by left hemisphere dominant thinking.

Obviously, we need to modify our curriculums to meet the needs of right as well as left hemisphere dominant learners. Before we begin planning how we can do this, there are several points that should be considered:

1. Some children are probably right hemisphere dominant and some left hemisphere dominant. However, many children do not show a decided preference for one hemisphere or the other. They appear to balance the two.
2. Many, but certainly not all, Native American children, will probably demonstrate right hemisphere dominant learning styles. Also, we may expect to find some non-Indian children with right hemisphere dominant learning styles.

3. Children may demonstrate only some of the characteristics of hemispheric dominance. They may have learned to respond in a right or left hemisphere dominant way in some situations but not in others.
4. Cultures may "specialize" hemispheric functioning, and through that specialization develop unique contributions to humanity as a whole. However, creative problem-solving in any culture requires the use of both hemispheres.
5. Any instructional approach should offer a learning environment which will encourage children to develop the processing of both hemispheres. Children should be given an opportunity to apply their preferred hemisphere whenever possible to learning new skills. However, they should also be exposed to activities which encourage the use of both hemispheres in situations where they are not penalized for failure, to provide opportunity for the weaker processes to develop.
6. At this point we cannot objectively assess learning styles with any degree of reliability. And even if we could, we do not want to dichotomize learning style and label children as "right-brained" or "left-brained." Such labeling would encourage teachers to limit children's cognitive development by locking them into the expectations that the label implies. Rather than attempt to diagnose children as a "right-brained" learner and prescribe "right-brained" activities for them, we want to broaden our teaching styles to include them.
7. We can observe children as they work, however, and be aware of learning strengths and areas of need. If a child appears to be having difficulty, we can ask ourselves, "Does this activity ask him to use predominantly left hemisphere processing? How can I alter the assignment so that he can use more right hemisphere strengths?"

8. Being a right hemisphere dominant learner means that the child approaches a task with predominantly right hemisphere processing strategies. It does not mean that he only uses his or her right hemisphere. Every task of any complexity at all requires the work of both hemispheres.

There are several kinds of things teachers can do to make learning more successful for right hemisphere dominant students. First, they can make their learning environments more informal and personal. They can give these children opportunities to work together on problem solving and they can discourage rather than encourage competition.

Secondly, when you design a lesson, incorporate as many strategies aimed at the right hemisphere learner as you can. Design lessons around understanding where they may have difficulty with language. For example, before you asked students to read a selection, spend ample time talking about experiences they may have that are somehow related to what they will read about. Assist them to verbalize and organize their ideas by drawing a schematic or flow chart of their ideas on the blackboard. This simple technique lets them use their right hemisphere strength in visual-spatial processing to experience the "shape" of the ideas. Give them direct assistance in following the authors' organization while they read, rather than before. Study guides are one technique for doing this. After they have read the selection, assist them in adding new information to the schematic that was made before they read. In this one technique, a teacher can capitalize on the right hemisphere dominant learners' strengths and at the same time give him direct assistance with processes that are difficult for them. This is just one example. As you continue to explore and understand the meaning of right hemisphere dominance, you will find many more ways to incorporate appropriate strategies into your lesson plans.

A third way teachers need to consider the right hemisphere dominant students in their classrooms is to search for approaches that are broad enough to allow children with a wide range of learning styles to experience success. This is particularly necessary in the field of reading methods because there exist such decidedly different approaches to the teaching of reading. Over the past several years, I have studied the research on the roles of each hemisphere in language and reading activities and I have continuously studied the American Indian culture to learn more about what right hemisphere dominant means. I have observed Native American children informally in their classrooms and consulted with both Native and Euro-American teachers of Native American children. As a result of my study, I have developed the following ten criteria for a reading program that would allow any Native American child to succeed at learning to read, irregardless of his or her hemispheric preference (Browne, 1985).

1. The program must be broad enough to allow whole brain learning from the beginning of instruction. Teaching techniques should be varied. At times new material should be presented in such a manner that a right hemisphere learner can most effectively organize and assimilate new meaning. At other times material can be presented in a linear, sequential manner. Teacher observation will quickly identify a child's most effective kind of technique. To enhance success, new learning material should be introduced in a manner that allows a child to use predominantly his or her preferred hemisphere. However, subsequent lessons on the same skill should bring the weaker hemisphere into play to give the child experience in using strategies with which (s)he is less comfortable.
2. The program must recognize that children come to school with already developed strategies for learning about language. It must allow

children to continue learning language in a natural way, much like they have already begun to learn.

3. The teaching of specific skills must be accomplished at a time when the child needs them to continue the flow of his learning. The holistic learner depends on a continuous flow of experience that has its beginning in direct experience. When that flow is interrupted by skills teaching that is unrelated to it, the learning is fractionated and rendered incoherent to the student.
4. The teaching of abstract skills must be accomplished with techniques that present all of the pieces simultaneously so that the relational processes can be used to organize the meaning of the whole. When pieces are presented sequentially and the child is asked to build meaning of the whole by accumulating meaning in a linear manner, the right hemisphere dominant child has difficulty.
5. Teaching strategies should depend heavily on providing models for language and thinking. Such models may be visual, auditory, or kinesthetic in nature. Or better yet, a combination of these. Right hemisphere relational thinking may depend heavily on comparisons to existing models to guide the expansion and refining of their use of language.
6. A reading program for right hemisphere dominant learners should make much use of rhythm and dramatic play associated with language. The holistic learner intakes messages most effectively with his or her entire body.
7. Graphonic, syntactic and semantic cueing systems of language should be presented together, rather than separately. The holistic, relational learner can more easily select the balance between these

kinds of reading cues that is most functional for him or her. When the graphophonic cueing system is presented first, the right hemisphere dominant learner is forced to attempt to use decoding strategies that are probably the least effective.

8. All of the uses for language - reading, writing, speaking, and listening - should be developed together in an interrelated manner. This holistic approach to the learning of language use allows the child to see relationships between them and to assimilate the general principals they all share.
9. A reading program should provide for a functional setting where the child can learn reading and other language arts through using them in personally meaningful activities.
10. A program should depend on strategies and techniques which accept the child's cultural and experiential background by allowing the child to begin with his or her own language and to organize meaning in unique and individual ways.

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